Complete Summary

GUIDELINE TITLE

Guidelines on diabetes, pre-diabetes, and cardiovascular diseases.

BIBLIOGRAPHIC SOURCE(S)

Task Force on Diabetes and Cardiovascular Diseases. Ryden L, Standl E, Bartnik M, Van den Berghe G, Betterridge J, de Boer MJ, Cosentino F, Jonsson B, Laakso M, Malmberg K, Priori S, Ostergren J, Tuomilehto J, Thrainsdottir I. Guidelines on diabetes, pre-diabetes, and cardiovascular disease: full text. Sophia Antipolis, France: European Society of Cardiology (ESC); 2007. 72 p. [711 references]

GUIDELINE STATUS

This is the current release of the guideline.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- February 28, 2008, Heparin Sodium Injection: The U.S. Food and Drug Administration (FDA) informed the public that Baxter Healthcare Corporation has voluntarily recalled all of their multi-dose and single-use vials of heparin sodium for injection and their heparin lock flush solutions. Alternate heparin manufacturers are expected to be able to increase heparin production sufficiently to supply the U.S. market. There have been reports of serious adverse events including allergic or hypersensitivity-type reactions, with symptoms of oral swelling, nausea, vomiting, sweating, shortness of breath, and cases of severe hypotension.
- February 26, 2008, Avandia (rosiglitazone): A new Medication Guide for Avandia must be provided with each prescription that is dispensed due to the U.S. Food and Drug Administration's (FDA's) determination that this medication could pose a serious and significant public health concern.
- November 14, 2007, Avandia (rosiglitazone): New information has been added to the existing boxed warning in Avandia's prescribing information about potential increased risk for heart attacks.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Diabetes (type 1 and type 2) and pre-diabetes
- Cardiovascular diseases

GUIDELINE CATEGORY

Diagnosis
Management
Prevention
Risk Assessment
Screening
Treatment

CLINICAL SPECIALTY

Cardiology
Endocrinology
Internal Medicine

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

To improve the management of:

- Patients with overt diabetes
- Patients at risk of developing diabetes, as demonstrated by impaired glucose tolerance
- Cardiovascular diseases in these patient populations

TARGET POPULATION

- Patients with overt diabetes

- Patients at risk of developing diabetes, as demonstrated by impaired glucose tolerance
- Patients with co-existing diabetes or pre-diabetes and cardiovascular diseases

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis, Screening, Risk Assessment

1. Definition and classification of diabetes and pre-diabetes states based on level of subsequent cardiovascular complications
2. Screening for diabetes type 2 based on oral glucose tolerance test (OGTT) and risk scores
3. Identification of subjects at high risk for cardiovascular disease or diabetes

Treatment/Management/Prevention

1. Patient education to improve metabolic and blood pressure control
2. Life style counselling and therapy
3. Self-monitoring of glucose
4. Statin therapy
5. Establishment of treatment targets: blood pressure, glycaemic control, low-density lipoprotein (LDL)-cholesterol, high-density lipoprotein (HDL)-cholesterol, triglycerides, smoking, weight, physical activity, dietary habits
6. Thromobolytic therapy for acute myocardial infarction
7. Angiography
8. Revascularization (percutaneous coronary interventions, coronary artery bypass surgery)
9. Prostacyclin infusion in lieu of revascularization for limb ischaemia
10. Beta-blocker therapy
11. Antiplatelet therapy (aspirin, clopidogrel, low-molecular-weight heparin)
12. Angiotensin-converting enzyme (ACE) inhibitor or angiotensin-II-receptor blocker therapy
13. Glycoprotein IIb/IIIa inhibitor therapy
14. Aldosterone antagonists
15. Diuretics
16. Insulin therapy
17. Pharmacological therapy for diabetes or impaired glucose tolerance

MAJOR OUTCOMES CONSIDERED

- Relative risk for and prevalence of diabetes and cardiovascular disease
- Incidence of stroke
- Morbidity and mortality
- Cost-effectiveness of interventions

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses

Level of Evidence B: Data derived from a single randomized clinical trial or large non-randomized studies

Level of Evidence C: Consensus of opinion of the experts and/or small studies, retrospective studies, registries

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The European Society of Cardiology (ESC) and the European Association for the Study of Diabetes (EASD) have decided to develop joint, evidence-based guidelines for "Diabetes and Cardiovascular Diseases." Experts from both sides were asked to form a Task Force and to write state-of-the-art chapters. Although individual authors have been assigned to draft the manuscripts according to their specific area of expertise, the guidelines were then extracted and harmonized as a true team effort by the whole group. Hence, the names of all authors appear only on the cover of these guidelines as members of the writing group. Some of the

members of the Task Force were helped in the literature search and writing process by members of their respective teams and these contributors are also named on the cover as contributors.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Classes of Recommendations

Class I: Evidence and/or general agreement that a given diagnostic procedure/treatment is beneficial, useful, and effective

Class II: Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the treatment or procedure

> **Class IIa**: Weight of evidence/opinion is in favour of usefulness/efficacy
>
> **Class IIb**: Usefulness/efficacy is less well established by evidence/opinion

Class III: Evidence or general agreement that the treatment or procedure is not useful/effective and in some cases may be harmful

COST ANALYSIS

The Cost-effectiveness of Intervention

There have been many studies investigating the cost-effectiveness of different treatment strategies for diabetic patients. Here the guideline developers will focus on the prevention of macrovascular complications, as they are the largest contributor to the costs associated with the disease.

Lipid-lowering using statins in diabetics have been studied in several studies. In a subgroup of the Scandinavian Simvastatin Survival Study (4S) Trial, cost-effectiveness ratios of treating diabetic patients with 20 to 40 mg simvastatin were found to be well below the levels that are usually considered cost-effective. Diabetic patients were also enrolled in the Heart Protection Study (HPS), which indicated acceptable cost-effectiveness ratios for patients with this risk level. One important thing to consider about these studies is that they used a cost of simvastatin prior to the expiry date of the patent. Thereafter the price dropped substantially which would mean that statin use in diabetics is likely to be cost-saving in secondary prevention and associated with very low cost-effectiveness ratios in primary prevention.

Another approach to prevention of macrovascular complication is through blood pressure control. This has been studied as part of the United Kingdom Prospective Diabetes Study (UKPDS), where tight blood pressure control using beta-blockers and angiotensin-converting enzyme (ACE)-inhibitors was investigated. A recent cost-effectiveness analysis of this intervention indicated that this treatment strategy was associated with a very high cost-effectiveness. In another study, a group of researchers investigated the cost-effectiveness of doxazosin in Italy and the United Kingdom, and also found acceptable cost-effectiveness ratios.

It can be concluded that the costs associated with diabetes make up a considerable share of the resources spent on healthcare throughout Europe. As the most important cost drivers are complications caused by the disease, proper management in the prevention of complications is essential.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guidelines were reviewed by independent referees appointed by the two scientific organizations whose identity were disclosed, once all criticisms and suggestions had been incorporated into the text to achieve the broadest possible expertise and consensus. The referees are also acknowledged with their names on the cover and are an important, integral part of this scientific guideline exercise.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions for the recommendation classes (I, II, IIa, IIb III) and levels of evidence (A, B, C) are given at the end of the "Major Recommendations."

Definition, Classification, and Screening of Diabetes and Pre-diabetic Glucose Abnormalities

Definition and Classification of Diabetes

The definition and diagnostic classification of diabetes and its pre-states should be based on the level of the subsequent risk of cardiovascular complications. **Class I, Level of Evidence B**.

Screening for Undiagnosed Diabetes

Early stages of hyperglycaemia and asymptomatic type 2 diabetes are best diagnosed by an oral glucose tolerance test (OGTT) that gives both fasting and two-hours post-load glucose (2-hPG) values. **Class I, Level of Evidence B**.

Detection for People at High Risk for Diabetes

Primary screening for the potential type 2 diabetes can be done most efficiently using a non-invasive risk score, subsequently combined with a diagnostic oral glucose tolerance testing in people with high score values. **Class I, level of Evidence A**.

Epidemiology of Diabetes, Impaired Glucose Homeostasis (IGH), and Cardiovascular Risk

Diabetes and Coronary Artery Disease (CAD)

The relationship between hyperglycaemia and cardiovascular disease (CVD) is to be seen as a continuum. For each 1% increase of glycated haemoglobin (HbA_{1C}), there is a defined increased risk for CVD. **Class I, Level of Evidence A**.

The risk of CVD for people with overt diabetes is increased by two to three times for men and three to five times for women compared to people without diabetes. **Class I, Level A**.

IGH and CAD

Cardiovascular Risk and Post-Prandial Hyperglycaemia

Information on post-prandial (post-load) glucose provides better information about the future risk for CVD than fasting glucose, and elevated post-prandial glucose also predicts the cardiovascular risk in subjects with normal fasting glucose levels. **Class I, Level of Evidence A**.

Glycaemic Control and Cardiovascular Risk

Improved control of post-prandial glycaemia may lower cardiovascular risk and mortality. **Class IIb, Level of Evidence C**.

Gender Differences in CAD Related to Diabetes

Glucometabolic perturbations carry a particularly high risk for cardiovascular morbidity and mortality in women, who in this respect need special medical attention. **Class IIa, Level of Evidence B**.

Glucose Homeostasis and Cerebrovascular Disease

People with diabetes and impaired glucose tolerance (IGT) have an increased risk for stroke. **Class I, Level of Evidence A**.

In stroke patients, unrecognized hyperglycaemia is mostly high post-load glucose seen in the OGTT, whereas the measurement of fasting glucose is insensitive in detecting unrecognized hyperglycaemia. **Class I, Level of Evidence B**.

Identification of Subjects at High Risk for CVD or Diabetes

The Metabolic Syndrome

The metabolic syndrome identifies people at a higher risk of CVD than that in the general population, although it may not provide a better or even equally good prediction of cardiovascular risk than scores based on the major cardiovascular risk factors (age, blood pressure, smoking, and serum cholesterol). **Class II, Level of Evidence B**.

Risk Charts

Several cardiovascular risk assessment tools exist and they can be applied to both non-diabetic and diabetic subjects. **Class I, level of Evidence A**.

An assessment of predicted type 2 diabetes risk should be part of the routine health care using the risk assessment tools available. **Class II, Level of Evidence A**.

Patients without known diabetes but with established CVD should be investigated with an OGTT. **Class I, Level of Evidence B**.

Preventing Progression to Diabetes

People at high risk for type 2 diabetes should receive appropriate life style counselling and if needed pharmacological therapy to reduce or delay their risk of developing diabetes. This may also decrease their risk of CVD. **Class I, Level of Evidence A**.

In people with IGT, the onset of diabetes can be delayed by certain drugs (such as metformin, acarbose and rosiglitazone). **Class I, Level of Evidence A**.

Prevention of CVD by Physical Activity

Diabetic patients should be advised to be physically active in order to decrease their cardiovascular risk. **Class I, Level of Evidence A**.

Treatment to Reduce Cardiovascular Risk

Life Style and Comprehensive Management

Structured patient education improves metabolic and blood pressure control. **Class I, Level of Evidence A**.

Non-pharmacological life style therapy improves metabolic control. **Class I, Level of Evidence A**.

Self-monitoring improves glycaemic control. **Class I, Level of Evidence A**.

Glycaemic Control

Near normoglycaemic control reduces microvascular complications. **Class I, Level of Evidence A**.

Near normoglycaemia reduces macrovascular complications. **Class I, Level of Evidence A**.

Intensified insulin therapy in type 1 diabetes improves morbidity and mortality. **Class I, Level of Evidence A**.

Early, stepwise increase of therapy towards pre-defined treatment targets improves a composite of morbidity and mortality in type 2 diabetes. **Class IIa, Level of Evidence B**.

Early initiation of insulin should be considered in patients with type 2 diabetes failing glucose target, and in patients with excessive post-prandial glucose excursions. Meal-time short-acting insulin is recommended. **Class IIb, Level of Evidence C**.

Metformin is recommended as first line drug in overweight type 2 diabetes. **Class IIb, Level of Evidence C**.

Dyslipidaemia

Secondary Prevention

Elevated low-density lipoprotein (LDL)- and low high-density lipoprotein (HDL)-cholesterol are important risk factors in people with diabetes. **Class I, Level of Evidence A**.

Statins are first-line agents for lowering LDL-cholesterol in diabetic patients. **Class I, Level of Evidence A**.

In diabetic patients with CVD, statin therapy should be initiated regardless of baseline LDL-cholesterol with a treatment target of $\leq$1.8 mmol/L. **Class I, Level of Evidence B**.

Primary Prevention

Statin therapy should be considered in adult patients with type 2 diabetes, without CVD, if total cholesterol >3.5 mmol/L (>135 mg/dL), with treatment aiming for an LDL-cholesterol reduction of 30 to 40%. **Class IIb, Level of Evidence B**.

Given the high lifetime risk of CVD, it is suggested that all type 1 patients over the age of 40 years should be considered for statin therapy. In patients 18 to 39 years (either type 1 or type 2), statin therapy should be considered when other risk factors are present, e.g., nephropathy, poor glycaemic control, retinopathy, hypertension, hypercholesterolaemia, features of the metabolic syndrome, or family history of premature vascular disease. **Class IIb, Level of Evidence C**.

Guidelines for HDL Cholesterol and Triglycerides

In diabetic patients with hypertriglyceridaemia >2 mmol/L (177 mg/dL) remaining after having reached the LDL-cholesterol target, it is recommended that statin therapy should be increased to reduce non-HDL cholesterol with a goal of therapy 0.8 mmol/L (31 mg/dL) higher than that identified for LDL. In patients on maximum dose, or maximum tolerated dose of statin, where LDL-C or non-HDL-C is not to goal, the addition of ezetimibe, a specific inhibitor of cholesterol absorption, should provide effective further cholesterol reduction. In some cases

combination therapy with nicotinic acid or fibrates may be considered. **Class IIb, level of Evidence B**.

Blood Pressure

In patients with diabetes and hypertension, the recommended target for blood pressure control is <130/80 mm Hg. **Class I, Level of Evidence B**.

The cardiovascular risk in patients with diabetes and hypertension is substantially enhanced. The risk can be effectively reduced by blood pressure-lowering treatment. **Class I, Level of Evidence A**.

The diabetic patient usually requires a combination of several anti-hypertensive drugs for satisfactory blood pressure control. **Class I, Level of Evidence A**.

The diabetic patient should be prescribed a renin-angiotensin system (RAS) inhibitor as part of the blood pressure-lowering treatment. **Class I, Level of Evidence A**.

Screening for microalbuminuria and adequate blood pressure-lowering therapy including the use of angiotensin-converting enzyme (ACE)-inhibitors and angiotensin receptor-II-blockers, improves micro- and macrovascular morbidity in type 1 and type 2 diabetes. **Class I, Level of Evidence A**.

Management of CVD

Treatment Principles

Risk Stratification

Early risk stratification should be part of the evaluation of the diabetic patient after acute coronary syndromes (ACS). **Class IIa, Level of Evidence C**.

Treatment Targets

Treatment targets, as listed in the table below, should be outlined and applied in each diabetic patient following an ACS. **Class IIa, Level of Evidence C**.

Table. Recommended Treatment Targets for Patients with Diabetes and CAD (adapted after the European Guidelines for Cardiovascular Disease Prevention)

Blood pressure (systolic/diastolic; mm Hg) In case of renal impairment, proteinuria > 1g/24h	<130/80 <125/75
Glycaemic control	

Table. Recommended Treatment Targets for Patients with Diabetes and CAD (adapted after the European Guidelines for Cardiovascular Disease Prevention)	
HbA_{1C} (%)[a]	≤6.5
Glucose expressed as venous plasma mmol/L (mg/dL)	
Fasting	<6.0 (108)
Post-prandial (peak)	<7.5 (135) diabetes type 2 7.5-9.0 (135-160) diabetes type 1
Lipid profile expressed in mmol/L (mg/dL)	
Total cholesterol	<4.5 (175)
LDL-cholesterol	≤1.8 (70)
HDL-cholesterol	
Men	>1.0 (40)
Women	>1.2 (>46)
Triglycerides[b]	<1.7 (<150)
TC/HDL[b]	<3
Smoking cessation	Obligatory
Regular physical activity (min/day)	>30-45
Weight control	
Body mass index (BMI) (kg/m^2)	<25
In case of overweight weight reduction (%)	10
Waist (optimum; ethnic specific; cm)	
Men	<94
Women	<80
Dietary habits	
Salt intake (g/day)	<6
Fat intake (% of dietary energy)	
Saturated	<10
Trans fat	<2

Table. Recommended Treatment Targets for Patients with Diabetes and CAD (adapted after the European Guidelines for Cardiovascular Disease Prevention)	
Polyunsaturated n-6	4-8
Polyunsaturated n-3	2 g/day of linolenic acid and 200 mg/day of very long chain fatty acids
[a] Diabetes Control and Complication Trial-standardized, for recalculation formula for some national standards in Europe. [b] Not recommended for guiding treatment, but recommended for metabolic/risk assessment	

Specific Treatment

Thrombolysis

Patients with acute myocardial infarction (AMI) and diabetes should be considered for thrombolytic therapy on the same grounds as their non-diabetic counterparts. **Class IIa, Level of Evidence A**.

Early Revascularization

Whenever possible, patients with diabetes and ACS should be offered early angiography and mechanical revascularization. **Class IIa, Level of Evidence B**.

Anti-ischaemic Medication

Beta-blockers reduce morbidity and mortality in patients with diabetes and ACS. **Class IIa, Level of Evidence B**.

Aspirin should be given for the same indications and in similar dosages to diabetic and non-diabetic patients. **Class II, Level of Evidence B**.

Adenosine diphosphate (ADP) receptor-dependent platelet activation (clopidogrel) should be considered in diabetic patients with ACS in addition to aspirin. **Class IIa, Level of Evidence C**.

ACE-Inhibitors

The addition of an ACE-inhibitor to other effective therapies reduces the risk for cardiovascular events in patients with diabetes and established cardiovascular disease. **Class I, Level of Evidence A**.

Metabolic Support and Control

Diabetic patients with AMI benefit from tight glucometabolic control. This may be accomplished by different treatment strategies. **Class IIa, Level of Evidence B**.

Revascularization (Intervention by Surgery or Percutaneous Coronary Intervention [PCI] Angioplasty)

Treatment decisions regarding revascularization in patients with diabetes should favour coronary artery bypass graft (CABG) surgery over percutaneous intervention. **Class IIa, Level of Evidence A**.

Whenever possible, patients with diabetes undergoing coronary bypass surgery should be offered at least one and often multiple arterial grafts. **Class I, Level of Evidence C**.

Adjunctive Therapy

Glycoprotein IIb/IIIa inhibitors are indicated in elective PCI in patients with diabetes. **Class I, Level of Evidence B**.

When PCI with stent implantation is performed in patients with diabetes, drug-eluting stents (DES) should be used. **Class IIa, Level of Evidence B**.

Revascularization and Reperfusion in MI

Mechanical reperfusion by means of primary PCI is the revascularization mode of choice in diabetic patients with AMI. **Class I, Level of Evidence A**.

Heart Failure and Diabetes

Treatment

ACE-inhibitors are recommended as first-line therapy in diabetic patients with reduced left ventricular (LV) dysfunction with or without symptoms of heart failure. **Class I, Level of Evidence C**.

Angiotensin-II-receptor blockers have similar effects in heart failure as ACE-inhibitors and can be used as an alternative or even as added treatment to ACE-inhibitors. **Class I, Level of Evidence C**.

Beta-blockers in the form of metoprolol, bisoprolol, and carvedilol are recommended as first-line therapy in diabetic patients with heart failure. **Class I, Level of Evidence C**.

Diuretics, in particular loop diuretics, are important for symptomatic treatment of patients with fluid overload due to heart failure. **Class IIa, Level of Evidence C**.

Aldosterone antagonists may be added to ACE-inhibitors, beta-blockers, and diuretics in diabetic patients with severe heart failure. **Class IIb, Level of Evidence C**.

Arrhythmias: Atrial Fibrillation (AF) and Sudden Death

Diabetes, AF, and Risk of Stroke

Aspirin and anticoagulant use as recommended for patients with AF should be rigorously applied in diabetic patients with AF to prevent stroke. **Class I, Level of Evidence C**.

Chronic oral anticoagulant therapy in a dose adjusted to achieve a target international normalized ration (INR) of 2 to 3 should be considered in diabetic patients with AF and one other moderate risk factor for thromboembolism, unless contraindicated. **Class IIa, Level of Evidence C**.

Sudden Cardiac Death

Control of glycaemia even in the pre-diabetic stage is important to prevent the development of the alterations that pre-dispose to sudden cardiac death. **Class I, Level of Evidence C**.

Microvascular disease and nephropathy are indicators of increased risk of sudden cardiac death in diabetic patients. **Class IIa, Level of Evidence B**.

Peripheral and Cerebrovascular Disease

Peripheral Vascular Disease

All patients with type 2 diabetes and CVD are recommended treatment with low-dose aspirin. **Class IIa, Level of Evidence B**.

In diabetic patients with peripheral vascular disease, treatment with clopidogrel or low molecular weight heparin may be considered in certain cases. **Class IIb, Level of Evidence B**.

Patients with critical limb ischaemia should if possible, undergo revascularization procedures. **Class I, Level of Evidence B**.

An alternative treatment for patients with critical limb ischaemia not suited for revascularization is prostacyclin infusion. **Class IIa, Level of Evidence A**.

Stroke

Prevention of Stroke

Normalization of blood pressure is recommended in all patients with diabetes for the prevention of stroke. **Class I, Level of Evidence A**.

For stroke prevention, blood pressure lowering is more important than the choice of drug. Inhibition of the renin-angiotensin-aldosterone system may have additional benefits beyond blood pressure lowering *per se*. **Class IIa, Level of Evidence B**.

Inhibition of the renin-angiotensin-aldosterone system may be considered also in diabetic patients with normal blood pressure levels. **Class IIa, Level of Evidence B**.

Patients with stroke should be treated with statins according to the same principles as non-diabetic subjects with stroke. **Class I, Level of Evidence B**.

Antiplatelet therapy with aspirin is recommended for primary and secondary prevention at stroke. **Class I, Level of Evidence B**.

Treatment of Acute Stroke

Patients with acute stroke and diabetes should be treated according to the same principles as stroke patients without diabetes. **Class IIa, Level of Evidence C**.

Optimization of metabolic conditions including glycaemic control should be considered as in any other acute disease condition. **Class IIa, Level of Evidence C**.

Intensive Care

Strict blood glucose control with intensive insulin therapy improves mortality and morbidity of adult cardiac surgery patients. **Class I, Level of Evidence B**.

Strict blood glucose control with intensive insulin therapy improves mortality and morbidity of adult critically ill patients. **Class I, Level of Evidence A**.

Health Economics and Diabetes

Lipid-lowering treatment provides a cost-effective way of preventing complications. **Class I, Level of Evidence A**.

Tight control of hypertension is cost-effective. **Class I, Level of Evidence A**.

Definitions:

Classes of Recommendations

Class I: Evidence and/or general agreement that a given diagnostic procedure/treatment is beneficial, useful, and effective

Class II: Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the treatment or procedure

> **Class IIa**: Weight of evidence/opinion is in favour of usefulness/efficacy
>
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Class III: Evidence or general agreement that the treatment or procedure is not useful/effective and in some cases may be harmful

Levels of Evidence

Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses

Level of Evidence B: Data derived from a single randomized clinical trial or large non-randomized studies

Level of Evidence C: Consensus of opinion of the experts and/or small studies, retrospective studies, registries

CLINICAL ALGORITHM(S)

An investigational algorithm for patients with coronary artery disease and diabetes mellitus is provided in the original guideline document.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations" section).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Improvement in the quality of management of patients who have both cardiovascular and metabolic disease in common

POTENTIAL HARMS

- Hypoglycaemia and other compound-specific effects of pharmacological therapy for diabetes (see Table 12 in the original guideline document).
- Complications of revascularization surgery
- Compound-specific effects of pharmacological therapy for cardiovascular disease and prevention

CONTRAINDICATIONS

CONTRAINDICATIONS

Thiazolidinediones are considered contraindicated in heart failure patients in New York Heart Association Class III-IV because of a risk for fluid retention and thereby worsening heart failure.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

The European Society of Cardiology (ESC) Guidelines represent the views of the ESC and were arrived at after careful consideration of the available evidence at the time they were written. Health professionals are encouraged to take them fully into account when exercising their clinical judgment. The guidelines do not, however, override the individual responsibility of health professionals to make appropriate decisions in the circumstances of the individual patients, in consultation with that patient, and where appropriate and necessary the patient's guardian or carer. It is also the health professional's responsibility to verify the rules and regulations applicable to drugs and devices at the time of prescription.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Chart Documentation/Checklists/Forms
Clinical Algorithm
Personal Digital Assistant (PDA) Downloads
Pocket Guide/Reference Cards
Quick Reference Guides/Physician Guides

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Task Force on Diabetes and Cardiovascular Diseases. Ryden L, Standl E, Bartnik M, Van den Berghe G, Betterridge J, de Boer MJ, Cosentino F, Jonsson B, Laakso M, Malmberg K, Priori S, Ostergren J, Tuomilehto J, Thrainsdottir I. Guidelines on diabetes, pre-diabetes, and cardiovascular disease: full text. Sophia Antipolis, France: European Society of Cardiology (ESC); 2007. 72 p. [711 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2007 Jan

GUIDELINE DEVELOPER(S)

European Society of Cardiology - Medical Specialty Society

SOURCE(S) OF FUNDING

European Society of Cardiology

GUIDELINE COMMITTEE

Task Force on Diabetes and Cardiovascular Diseases

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Task Force Members: Lars Rydén (Co-Chairperson) (Sweden); Eberhard Standl (Co-Chairperson) (Germany); Malgorzata Bartnik (Poland); Greet Van den Berghe (Belgium); John Betterridge (UK); Menko-Jan de Boer (The Netherlands); Francesco Consentino (Italy); Bengt Jönsson (Sweden); Markku Laakso (Finland); Klas Malmberg (Sweden); Silvia Priori (Italy); Jan Östergren (Sweden); Jaakko Tuomilehto (Finland); Inga Thrainsdottir (Iceland)

European Society of Cardiology (ESC) Committee for Practice Guidelines (CPG): Silvia Priori (Chairperson) (Italy); Jean-Jacques Blanc (France); Andrzej Budaj (Poland); John Camm (UK); Veronica Dean (France); Jaap Deckers (The Netherlands); Kenneth Dickstein (Norway); John Lekakis (Greece); Keith McGregor (France); Marco Metra (Italy); João Morais (Portugal); Ady Osterspey (Germany); Juan Tamargo (Spain); José Luis Zamorano (Spain)

Document Reviewers: Jaap Deckers, (CPG Review Coordinator) (The Netherlands); Michael Bertrand (France); Bernard Charbonnel (France); Erland Erdmann (Germany); Ele Ferrannini (Italy); Allan Flyvbjerg (Denmark); Helmut Gohlke (Germany); Jose Ramon Gonzalez Juanatey (Spain); Ian Graham (Ireland); Pedro Filipe Monterio (Portugal); Klaus Pargofer (Germany); Kalevi Pyörälä (Finland); Itamar Raz (Israel); Guntram Schernthaner (Austria); Massimo Volpe (Italy); David Wood (UK)

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

In compliance with European Board for Accreditation in Cardiology/European Accreditation Council for Continuing Medical Education (EBAC/EAC CME) guidelines, all authors participating in this programme have disclosed potential conflicts of interest that might cause a bias in the article. The Organizing Committee is responsible for ensuring that all potential conflicts of interest

relevant to the programme are declared to the participants prior to the CME activities.

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the European Society of Cardiology (ESC) Web site.

Print copies: Available from Oxford University Press, Great Clarendon Street, Oxford, OX2 6DP, UK, Tel: +44 (0) 1865 353263, Fax: +44 (0) 1865 353774, Web site: http://www.eurheartj.oxfordjournals.org/.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Guidelines on diabetes, pre-diabetes, and cardiovascular diseases: executive summary. The Task Force on Diabetes and Cardiovascular Diseases of the European Society of Cardiology and the European Association for the Study of Diabetes. Eur Heart J 2007;28:88-136. Electronic copies: Available in Portable Document Format (PDF) from the European Society of Cardiology (ESC) Web site.
- Diabetes, pre-diabetes, and cardiovascular diseases. Pocket guideline. Electronic copies: An order form for ESC pocket guidelines is available in Portable Document Format (PDF) from the European Society of Cardiology (ESC) Web site. Also available for PDA download from the ESC Web site.
- Recommendations for guidelines production. A document for Task Force Members responsible for the production and updating of ESC guidelines. 2006 Jun 28. 21 p. Available from the ESC Web site.

Print copies: Available from Oxford University Press, Great Clarendon Street, Oxford, OX2 6DP, UK, Tel: +44 (0) 1865 353263, Fax: +44 (0) 1865 353774, Web site: http://www.eurheartj.oxfordjournals.org/.

Additionally, a sample type 2 diabetes risk assessment form can be found in the original guideline document.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI Institute on June 18, 2007. This summary was updated by ECRI Institute on November 28, 2007 following the U.S. Food and Drug Administration advisory on the Avandia (rosiglitazone maleate) Tablets. This summary was updated by ECRI Institute on March 10, 2008 following the U.S.

Food and Drug Administration advisory on Avandia (rosiglitazone maleate). This summary was updated by ECRI Institute on March 14, 2008 following the updated FDA advisory on heparin sodium injection.

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Date Modified: 9/15/2008